

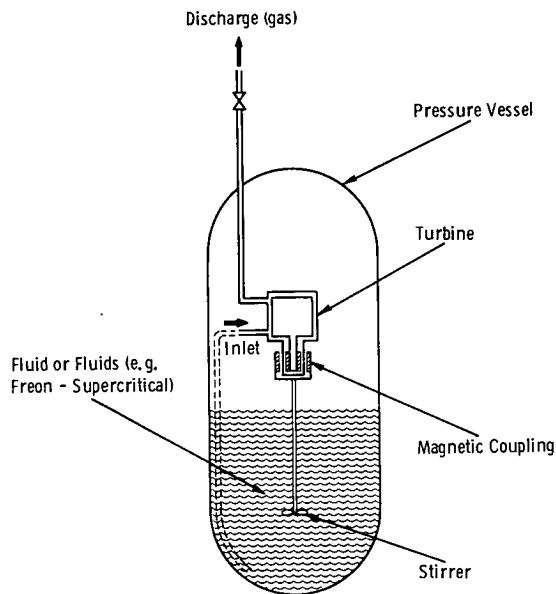
# NASA TECH BRIEF

## *Lewis Research Center*



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### Self-Powered Mixer for Pressurized Containers



#### The Problem:

To provide an internal device to mix or stir the contents of a pressurized supply tank without requiring externally-supplied power. Such a device is needed when the fluid contained in the tank is a mixture of different compositions or densities and must be mixed prior to being discharged, and when the use of external power is undesirable or inconvenient.

#### The Solution:

A mechanical stirrer is installed entirely within the tank and powered by a turbine driven by the discharge flow of the fluid. The contents of the tank are automatically mixed whenever the fluid in the tank is discharged.

#### How It's Done:

A schematic drawing of the device is shown in the figure. When the discharge valve is opened, the fluid in the tank flowing through the discharge line passes through the turbine causing it to rotate. The stirrer coupled to the

turbine rotates with it and mixes the contents of the tank. A magnetic coupling is used to eliminate the need for a shaft seal, particularly in high-pressure tanks.

#### Notes:

1. A stirrer of this design was built for and used in a high-pressure tank containing Freon at  $3.45 \text{ MN/m}^2$  (500 psi) and 422 K ( $300^\circ\text{F}$ ) to inhibit stratification. A pressure differential of  $0.14 \text{ MN/m}^2$  (20 psi) was sufficient to operate the stirrer.
2. This stirrer can be used in many types of applications. Two such applications are:
  - a. In cryogenic tanks where fluids tend to stratify causing pressure buildup. Venting a tank through the stirrer thoroughly re-mixes the fluid contents resulting in rapid depressurization with comparatively little loss of fluid and greater safety.
  - b. In pressurized containers where the contents tend to separate and must be thoroughly mixed prior to being discharged for use. For example, this device installed inside a portable spray-paint container would insure discharge of a well-mixed spray throughout the operation.
3. No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer  
Lewis Research Center  
21000 Brookpark Road  
Cleveland, Ohio 44135  
Reference: B73-10312

#### Patent Status:

NASA has decided not to apply for a patent.

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Category 03